length of two tentacular arms, 24 ft. each; eight pedal appendages, 6 ft. in length, and 9 in. in circumference nearest the head; the sucking-discs are denticulated, and in some instances measure 1¼ in. in diameter. This individual has been preserved, and its measurements are therefore authentic; but still larger specimens are believed to exist, and an account is given of an encounter between some fishermen and a huge creature which, on being struck by them, attacked their boat by twining its arms round the vessel. Two of the arms were cut off by a fisherman, when the squid moved off, ejecting a large quantity of inky fluid to cover its retreat. A portion of one of these arms, measuring 19 ft., has been preserved, but it is said that 6 ft. of it were destroyed, while the fishers estimate that they left 10 ft. more on the body of the squid. This would bring its length to 35 ft. It is to be hoped that more care will in future be taken to prevent the mutilation of specimens; and the capture of the first-mentioned one will, no doubt, excite the fishermen and others to greater care and exertions in looking out for still larger examples. The first squid was caught in Logy Bay, Newfoundland. The encounter with the second took place off Portugal Cove, Conception Bay, about 9 miles from St. John's.

AT a recent meeting of the Essex Institute (Salem, Mass.), Mr. Byron Groce of Peabody read a paper on "The Study of Natural History in Schools," in which he advocated its introduction by substituting it for some of the less useful studies now pursued. He also gave an account of the method he had followed in the High School of Peabody, stating that during the summer he took his school into the woods and fields for a half day each week, taught the scholars to collect specimens and preserve them properly; then had the specimens arranged in the school cabinet, and on unpleasant days in the winter they were used for instruction. In this way a lively interest had been created in the school, and a Natural History Club had been formed among the scholars for the purpose of carrying on the study.

A NEW illustrated weekly newspaper is announced for first appearance on March 7. The title is the *Pictorial World*. We trust the projectors will be wise enough—to take the word in its largest sense—to let its readers know something of what is being done in the world of Science.

WE have received a map (published by the U.S. Geological Survey) of the sources of the Snake River, with its tributaries, together with portions of the head waters of the Madison and Yellowstone, from surveys and observations of the Snake River Expedition, by G. R. Bechler, Chief Topographer, and James Stevenson, Director. The scale is five miles to an inch, and all the remarkable features of the extensive district, which includes the Yellowstone National Park, and the nature and products of the ground, are clearly indicated.

WE have received the third volume, for 1873, and the commencement of the fourth volume of the "Procès-verbaux des Séances de la Société Malacologique de Belgique," showing the activity with which this department of Natural History is pursued in Belgium.

THE additions to the Zoological Society's Gardens during the past week include a Crested Agouti (*Dasyprocta cristata*), from Mexico, presented by Mr. C. H. M. de Lichtacbel; a Pennant's Parakeet (*Platycercus pennanti*), and a Cockateel (*Calopsitta novæ-hollandiæ*), from Australia, presented by Dr. H. Wheeler; a Common Gull (*Larus canus*), British, presented by Mr. W. K. Stanley; a Malayan Hornbill (*Buceros malayanus*), from Malacca, purchased; and a hybrid Pheasant (between *Thaumelia amherstiæ* and *T. picta*), received in exchange.

SCIENTIFIC SERIALS

Justus Liebig's Annalen der Chemie u. Pharmacie, Band 170, Heft 1 und 2. This number contains the following papers:—On the chlorides and oxy-chlorides of sulphur, by A. Michaelis. The author describes the compound SCl_4 and other chlorides, also an oxy-chloride of the formula $S_2O_5Cl_2$. He gives tables and curves showing the dissociation of SCl_4 which is very rapid between – 20° when 100 per cent. of that body exists and + 6°·2 when only 2·43 per cent. exists as SCl_4, the rest consisting of SCl_2 and chlorine. SCl_2 dissociates much less rapidly, 5·44 per cent. existing at a temperature of + 120°. Researches on the nature and constitution of gallic acid, by H. Schiff. A correction of the formula of carbazolin, by C. Gräbe.—On capronic acid contained in the crude butyric acid of fermentation, by A. Lieben—On the salts of capronic acid derived from fermentation, by F. Kottal.—On a condensation product of oxybenzoic acid, by L. Barth and C. Senhofer. The author's obtained a body of the formula $C_{14}H_8O_4$; two of the hydrogens of this formula are replaceable by metals. The Ba Ca, K and Na salts thus formed are described. On treating the original body with zinc, anthracene was obtained. They propose to call this body Anthraflavon; it is useles as a dye-stuff.—On phenol-trisulphuric acid, by C. Senhofer. The acid is prepared by acting on sulphuric acid with phosphoric anhydride in the presence of phenol; it is a tribasic acid of the formula $C_6H_6S_3O_{10}$ crystallising with 3½ molecules of water. Several of its salts are described.—On orthoxylol prepared from liquid brom-toluol, by P. Jannasch and H. Hübner.—On the action of ozone on carburetted hydrogen, by A. Houzeau and A Renard. This is a translation from a paper in the *Comptes Rendus*, vol. lxxvi., 572.—On dichlorglycide, by A. Claus. This body is prepared by the action of potassic hydrate on trichlorhydrin. On the action of potassic cyanide on dichlorglycide, by the same author.—On œnanthylic acid and normal heptyl alcohol, by Harry Grimshaw and C. Schorlemmer.—On trimethyl acetic acid, by A. Butlerow.—On the dichlor propionic ether from glyceric acid, by Messrs. Werigo and Werner.—Contributions to our knowledge of citric acid; and On baric citraconate, by H. Kämmerer.—On dissociation, by A. Horstmann.—The number concludes with a short reply to Butlerow's paper on trimethyl carbinol, by E. Linnemann.

Bulletin de la Société Imperiale des Naturalistes de Moscou. No. 2. 1873.—This number commences with a paper by Dr. Koch on malformations in the embryos of species of salmon and Coregonus; the various monstrosities being treated under the headings of (1) Dicephaly; (2) Diplomyelia (duplicity of spinal cord, total or partial; (3) Divergences of body from its long axis; (4) Defects in organs of locomotion; (5) Anomalies in the vegetative sphere; (6) Defects in organs of sense. As to the disputed point how double monsters arise, Dr. Koch finds confirmation of I. Müller's view, according to which they are produced through union of two organised embryos arising from an imperfect fission. He also asserts that double monsters, where both bodies are formed alike, never live after leaving the egg, and when the yolk has been absorbed; other monsters may, if the form permits of food being procured. From experiments made on production of monsters, it seemed well established, that unfavourable conditions, such as shaking, were peculiarly apt to cause them; even double formations, but only of a certain kind, viz. *Diplomyelia partialis*, not *D. totalis*. The influence of temperature was also seen in the fact, that, with embryos in these unfavourable conditions, a difference of three degrees R. (above the normal cold temperature), made a difference of twelve days in the time of development, which was to this extent retarded. The paper is accompanied with numerous illustrations.—M. Wolkenstein continues his account of anthropological researches on the ancient cemeteries of Waldaï, named "Jalnikis;" giving here detailed measurements of the skeletons found in these peculiar tombs.—M. Becker describes a journey he made in 1872 to several places in the neighbourhood of the Caspian and in South Daghestan; apppending a list of plants and animals found there.—M. Truntschold furnishes some measurements of *Elasmotherium sibericum*; M. Motschoulsky a list of new species of Coleoptera; and there are one or two notes, in Russ, on botanical subjects.

Astronomische Nachrichten, No. 1973. In this number Dr. Stein gives an account of an apparatus for astronomical photography, with which the negatives are taken without the use of a dark room or tent, and if useful in practice, it justly deserves credit. It consists practically of a sort of flat box of glass, one

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side of which is the collodionised plate which fits water-tight against the other sides by means of india-rubber packing. There is a tube passing into this box through which first the ordinary silver solution is poured, and then by laying the collodionised plate downwards it is covered by the solution and sensitised; this is then drawn off, and the box, which is contained in a suitable holder, placed on the telescope and exposed by drawing away the non-actinic glass cover in front. After exposure the coloured glass is replaced, the box removed and developed by pouring in the solution in the same manner as the silver, in the meantime watching the plate through the coloured glass; the washing is then proceeded with in the same manner.—Dr. Stein proposes to use this method for photographing the transit of Venus.—Prof. Schmidt contributes a paper on the rotation of Jupiter, in which he discusses all the old observations of Cassini and others. From his list we gain that these observers differed to the amount of 6^{m}, the minimum being $9^{h}\ 50^{m}$, and the maximum $9^{h}\ 56^{m}$. From Prof. Schmidt's observations in 1873, he obtains a period of $9^{h}\ 56^{m}\ 7{\cdot}2^{s}$.

Archives des Sciences Physiques et Naturelles, Dec. 15, 1873.—In this number a short opening notice of M. de la Rive is followed by an article by M. Wiedemann, being an extract from his recent work on elliptic polarisation of light, and its relations with the superficial colours of bodies. The author shows that superficial colours change considerably with the nature (indices of refraction) of the substances in contact with which they are produced; and colours the most strongly reflected present generally the most intense elliptic polarisation, provided the reflection occurs in air or in vacuo. The principal angles of incidence undergo the most rapid modifications for wave-lengths corresponding nearly to the bands of absorption. M. Wiedemann's work elucidates the connection between the phenomena of bodies with superficial colours and the principal angles of incidence and relations of amplitude.—Dr. Hermann Müller's recent interesting work on fertilisation of flowers by insects is reviewed in a paper which gives a succinct *résumé* of the principal results.—M. Plantamour furnishes an account of the proceedings of the Meteorological Congress held at Vienna in 1873, and the circumstances which led to it.—There is also a note on the early development of Geryonides, by M. Fol; and this is followed by the usual scientific summary.

Ocean Highways, February.—About one-third of this number is occupied by a paper by Captain R. F. Burton, describing "Two Trips on the Gold Coast," the first being to the Beaulah Gardens and Agrimanti Hills, and the second along the shore to the Volta River. The paper, which is written in Captain Burton's characteristic and attractive style, and illustrated by two maps, is full of information, and will no doubt prove interesting to many at the present time. An article on the Bengal Famine recounts the principal Indian famines from 1661 to the present time, and shows how much could be done to foresee and obviate the consequences of famine by a more scientific investigation of the laws which regulate meteorological phenomena. The article is accompanied by a map showing the extent of the famine districts. In a short article on "Wyche's Land," called by the Germans after King Karl of Wurtemburg, it is shown satisfactorily, we think, that the honour of the discovery, by right, belongs to Edge's expedition in 1617, and that the name then imposed should remain unchanged. Some interesting details are given of Richard Wyche or Wiche, the London merchant, who did much to encourage early discovery. Other articles are on "European Emigration to the Argentine Republic," and on the "Provindah Trade," or trade of the Lohani merchants, who are the channels of communication between India and Central Asia.

SOCIETIES AND ACADEMIES

Royal Society, Feb. 12.—"On the Division of Sound by a layer of flame or heated gas, into a reflected and a transmitted portion," by John Cottrell, Assistant in the Physical Laboratory of the Royal Institution; communicated by Prof. Tyndall, F.R.S.

A vibrating bell contained in a padded box was directed so as to propagate a sound-wave through a tin tube and its action rendered manifest by its causing a sensitive flame placed at a distance in the direction of the sound-wave to become violently agitated.

The invisible heated layer immediately above the luminous portion of an ignited coal-gas flame issuing from an ordinary bat's-wing burner was allowed to stream upwards across the end of the tin tube, from which the sound-wave issues. A portion of the sound-wave, issuing from the latter, was reflected at the limiting surfaces of the heated layer; and a part being transmitted through it, was now only competent to slightly agitate the sensitive flame.

The heated layer was then placed at such an angle that the reflected portion of the sound-wave was sent through a second tin tube (of the same dimensions as the above), and its action rendered visible by its causing a second sensitive flame placed at the end of the tube to become violently affected. This action continued so long as the heated layer intervened; but upon its withdrawal the first-mentioned sensitive flame, receiving the whole of the direct pulse, became again violently agitated, and at the same moment the second sensitive flame, ceasing to be affected, resumed its former tranquillity.

Feb. 19.—"On the Number of Figures in the Period of the Reciprocal of every Prime Number below 17,000," by William Shanks, Houghton-le-Spring, Durham.

"On an Instrument for the Composition of the Harmonic Curves," by E. A. Donkin, Fellow of Exeter College, Oxford.

"On the Absorption of Carbonic Acid by Saline Solutions," by J. Y. Buchanan, chemist on board H.M.S. *Challenger.*

Linnean Society, Feb. 19.—J. Gwyn Jeffreys in the chair.—The chairman announced that a Special General Meeting of the Society would be held on Thursday, March 5, at 8 P.M., to consider alterations in the Bye-laws of the Society." The following papers were read:—Systematic list of the Spiders at present known to inhabit Great Britain and Ireland, by the Rev. O. P. Cambridge.—Some observations on the vegetable productions and rural economy of the province of Baghdad, by Surgeon-major W. H. Colvill.—Note on the Bracts of Crucifers, by Dr. M. T. Masters.

Zoological Society, Feb. 17.—George Busk, F.R.S. vice-president, in the chair. Mr. Busk exhibited some skulls of the tiger and leopard from China, procured by Mr. R. Swinhoe, and showed that those from the northern and southern provinces did not appear to be specifically distinct.—A communication was read from Mr. L. Taczanowski, Conservator of the Museum of Warsaw, containing the descriptions of twenty-four new birds, obtained by Mr. Constantine Jelski in Central Peru. Amongst these was a new Cotingine form, proposed to be called *Dolyornis sclateri*, and four new humming-birds named respectively *Metallura hedvigæ*, *Helianthea dichroura*, *Eriocnemis sapphiropygia* and *Lampraster branickii.*—A communication was read from Sir Victor Brooke, Bart., describing a new species of Gazelle, founded on two specimens living in the Society's Menagerie, which he proposed to call *Gazella muscatensis.*—A communication was read from Dr. T. Schomburgh, Director of the Botanic Gardens, Adelaide, containing an account of the habits of the Australian Coote (*Fulica australis*) as observed in the Gardens under his charge.—Mr. E. Ward exhibited the head of a supposed new species of Wild Sheep, from Ladak, which he proposed to name *Ovis brookei*, after Sir Victor Brooke.—Dr. J. E. Gray, F.R.S., communicated some notes on the Crocodile of Madagascar, which he proposed to distinguish from *Crocodilus vulgaris* of Continental Africa, and to call *Crocodilus madagascariensis.*—A communication was read from Mr. W. N. Lockington, of Humboldt County, California, containing some notes on the mammals and birds met with in that part of the State of California.

Mathematical Society, Feb. 12.—Dr. Hirst, F.R.S., president, in the chair.—Prof. Clifford gave in some detail a statement of the views advanced in his paper on the foundations of dynamics.—A discussion ensued, in which Messrs. Wilkinson, Moulton, Cayley, Roberts, and G. H. Lewes took part.—Mr. Clifford having answered questions and replied to objections, proceeded next to give an account of a paper on the free motion of a solid in elliptic space.—Owing to the lateness of the hour a paper by Mr. C. J. Monro, entitled "Note on the Inversion of Bernoulli's Theorem in Probabilities," was taken as read. Under the name of Bernoulli's Theorem are comprehended two theorems which, with a little licence, we may distinguish as the deductive and the inductive. The deductive theorem assumes the constant probability p of a given result on a single trial, and determines the probability P that on m trials the result will be produced from $mp - l$ to $mp + l$ times, or from $x - l$ to $x + l$, if x is the greatest integer in $mp + p$. The inductive theorem

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